

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
4 November 2004 (04.11.2004)

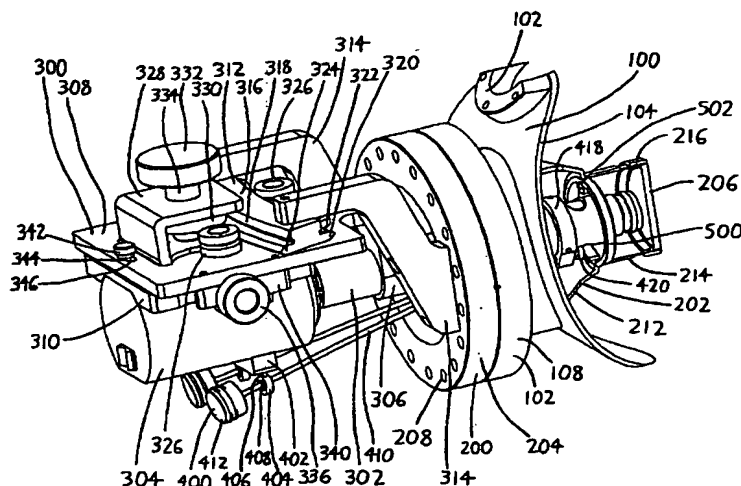
PCT

(10) International Publication Number
WO 2004/095500 A3

- (51) International Patent Classification⁷: **G02B 7/00**, (74) Agents: **FIESCHKO, Craig, A. et al.**; DeWitt Ross & Stevens S.C., Suite 401, 8000 Excelsior Drive, Madison, WI 53717-1914 (US).
- (21) International Application Number: **PCT/US2004/011553** (81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (22) International Filing Date: 15 April 2004 (15.04.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 10/419,035 18 April 2003 (18.04.2003) US (84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- (71) Applicant (*for all designated States except US*): **IMAGO SCIENTIFIC INSTRUMENTS [US/US]**; 6300 Enterprise Lane, Madison, WI 53719 (US).
- (72) Inventor; and
- (75) Inventor/Applicant (*for US only*): **STRAIT, David, Robert [US/US]**; 5907 Shumann Drive, Madison, WI 53711 (US).
- Published:
— with international search report

[Continued on next page]

(54) Title: **VACUUM CHAMBER WITH RECESSED VIEWING TUBE AND IMAGING DEVICE SITUATED THEREIN**



(57) Abstract: A vacuum chamber (100) includes chamber walls (104) separating a chamber interior and a chamber exterior, with one or more access ports (102) defined in the chamber walls. A viewing tube (200) extends from the chamber exterior into the chamber interior and terminates in a window (206). A positioner (300) for imaging devices (304) is then provided within the viewing tube, and is thus situated at least partially within the chamber interior with its imaging device(s) oriented towards the window of the viewing tube to allow imaging of areas within the vacuum chamber. The positioner preferably allows translation and/or rotation of an imaging device within the viewing tube within two perpendicular planes oriented along the axis of the viewing tube, thereby allowing the imaging device to view an area of interest from more angles oriented about the area of interest than would otherwise be possible if the imaging device was situated outside the vacuum chamber.



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(88) Date of publication of the international search report:
14 July 2005

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US2004/011553

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 G02B7/00 B01J3/00 H01J37/22 F16M11/06		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC 7 G02B B01J G01D H01J H01P F16M		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, WPI Data, PAJ		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 588 999 A (TAKAHASHI ET AL) 31 December 1996 (1996-12-31) abstract column 4, line 1 - column 6, line 4; figures 1-3	1, 4
X	US 4 834 394 A (KATZ ET AL) 30 May 1989 (1989-05-30) column 1, line 22 - column 3, line 68; figure 1	1
A	US 6 354 544 B1 (MUZILA MICHAEL) 12 March 2002 (2002-03-12) abstract; figures 1-4	2-7
<input type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "G" document member of the same patent family		
Date of the actual completion of the international search 17 May 2005		Date of mailing of the international search report 27/05/2005
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer Lang, T

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2004/011553

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 5588999	A	31-12-1996	JP	2912842 B2	28-06-1999
			JP	8193964 A	30-07-1996
US 4834394	A	30-05-1989	US	4811958 A	14-03-1989
US 6354544	B1	12-03-2002	NONE		

REVISED VERSION

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
4 November 2004 (04.11.2004)

PCT

(10) International Publication Number
WO 2004/095500 A3

(51) International Patent Classification:
B01J 3/00, H01J 37/22, F16M 11/06

G02B 7/00,

(74) Agents: FIESCHKO, Craig, A. et al.; DeWitt Ross & Stevens S.C., Suite 401, 8000 Excelsior Drive, Madison, WI 53717-1914 (US).

(21) International Application Number:

PCT/US2004/011553

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(22) International Filing Date: 15 April 2004 (15.04.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

10/419,035

18 April 2003 (18.04.2003)

US

(71) Applicant (for all designated States except US): IMAGO SCIENTIFIC INSTRUMENTS [US/US]; 6300 Enterprise Lane, Madison, WI 53719 (US).

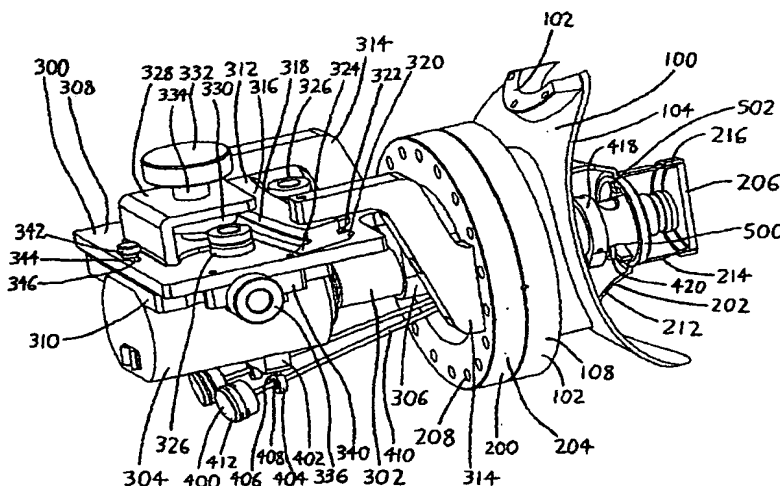
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(72) Inventor; and

(75) Inventor/Applicant (for US only): STRAIT, David, Robert [US/US]; 5907 Shumann Drive, Madison, WI 53711 (US).

[Continued on next page]

(54) Title: VACUUM CHAMBER WITH RECESSED VIEWING TUBE AND IMAGING DEVICE SITUATED THEREIN



(57) Abstract: A vacuum chamber (100) includes chamber walls (104) separating a chamber interior and a chamber exterior, with one or more access ports (102) defined in the chamber walls. A viewing tube (200) extends from the chamber exterior into the chamber interior and terminates in a window (206). A positioner (300) for imaging devices (304) is then provided within the viewing tube, and is thus situated at least partially within the chamber interior with its imaging device(s) oriented towards the window of the viewing tube to allow imaging of areas within the vacuum chamber. The positioner preferably allows translation and/or rotation of an imaging device within the viewing tube within two perpendicular planes oriented along the axis of the viewing tube, thereby allowing the imaging device to view an area of interest from more angles oriented about the area of interest than would otherwise be possible if the imaging device was situated outside the vacuum chamber.

WO 2004/095500 A3



Published:

- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(88) Date of publication of the international search report:

14 July 2005

Date of publication of the revised international search report:

1 September 2005

(15) Information about Correction:

see PCT Gazette No. 35/2005 of 1 September 2005, Section II

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US2004/011553

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G02B7/00 B01J3/00 H01J37/22 F16M11/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G02B B01J G01D H01J H01P F16M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 588 999 A (TAKAHASHI ET AL) 31 December 1996 (1996-12-31) abstract column 4, line 1 - column 6, line 4; figures 1-3	1,4, 15-18
X	US 4 834 394 A (KATZ ET AL) 30 May 1989 (1989-05-30) column 1, line 22 - column 3, line 68; figure 1	1,15,16, 19,20
A	US 6 354 544 B1 (MUZILA MICHAEL) 12 March 2002 (2002-03-12) abstract; figures 1-4	2-7

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

14 June 2005

Date of mailing of the international search report

20.06.05

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Lang, T

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2004/011553

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 5588999	A	31-12-1996	JP	2912842 B2	28-06-1999
			JP	8193964 A	30-07-1996
US 4834394	A	30-05-1989	US	4811958 A	14-03-1989
US 6354544	B1	12-03-2002	NONE		